

Programmed timer 42 may include a timer 60, Fig. 6, which operates driver circuit 62 that causes actuator motor 44 to step through the three positions of swinger 48: positive port 34, negative port 38, and dwell port 40. An alternate output 59 of the timer 60 (or of driver 62) indicates when the driver 62 is holding the swinger 48 at the dwell port 40, and provides one input to AND gate 66. When pressure sensor 26 senses that a patient inhalation is beginning it also provides an input to AND gate 66. When both those inputs are present at AND gate 66 it provides an output on line 28 to timer 60 to start the cycle again beginning with connection of swinger 48 to positive port 34.

Although specific features of the invention are shown in some drawings and not in others, this is for convenience only as each feature may be combined with any or all of the other features in accordance with the invention. The words "including", "comprising", "having", and "with" as used herein are to be interpreted broadly and comprehensively and are not limited to any physical interconnection. Moreover, any embodiments disclosed in the subject application are not to be taken as the only possible embodiments.

Other embodiments will occur to those skilled in the art and are within the following claims:

What is claimed is:

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For: IMPROVED INSUFFLATION-EXSUFFLATION SYSTEM FOR
REMOVAL OF BRONCHO-PULMONARY SECRETIONS WITH
AUTOMATIC TRIGGERING OF INHALATION PHASE

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1 1. An improved insufflation-exsufflation system for removal of broncho-
2 pulmonary secretions with automatic triggering of inhalation phase comprising:
3 a conduit for connection to a patient's airway;
4 a pressure source with a positive pressure port and a negative pressure
5 port;
6 a sensor system for sensing an inhalation by the patient; and
7 a controller system for driving said switching device to connect said conduit
8 sequentially to said positive port, said negative port and said dwell port and to return again
9 to said positive port in response to said sensor system sensing an inhalation by the patient
10 when said conduit is connected to said dwell port.

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1 2. The improved insufflation-exsufflation system of claim 1 in which said
2 switching device includes a selector valve and an actuator device.

1 3. The improved insufflation-exsufflation system of claim 1 in which said
2 sensor system includes a pressure sensor in said conduit.

1 4. The improved insufflation-exsufflation system of claim 1 in which said

2 sensor system includes an airflow detector in said conduit.

1 5. The improved insufflation-exsufflation system of claim 1 in which said
2 controller system includes a programmed timer.

1 6. The improved insufflation-exsufflation system of claim 1 in which said
2 dwell port is connected to atmospheric pressure.

1 7. The improved insufflation-exsufflation system of claim 1 in which said
2 dwell port includes a restrictor portion to increase sensitivity.